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ABSTRACT

The adjustment of librarians to technological change has been difficult because they have been too close observers of the present at the expense of daydreaming about society's likely future. The brisk pace of business, industry, and Wall Street has been accelerated even more by developments in information technology and computer communications. A shorter attention span--once viewed as a disability--is becoming a useful strategy for living in a fast-forward society that does not believe in long-term decision making, historical rumination, or second-guessing of events. The belief that learning takes a long period of time and that the quality of learning is enhanced by the ordeal of acquiring it, will end in the next century. Librarians must put a sharper point on public service, put information in the hands of the users more quickly, and be willing to make discriminations about the quality of our material. Librarians must replace the role of unbiased, impartial, and remote servants with the role of being highly informed, opinionated professionals. Further, information specialists will flourish as long as they take themselves seriously, and libraries will succeed as long as they are perceived as purveyors of ideas. (SD)

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Crunching Knowledge: The Coming Environment for the Information Specialist

MILO NELSON

The short space of time between now and the beginning of the twenty-first century is offering everyone an opportunity to think about the future, to predict what may lie ahead, and to suggest how we might best prepare ourselves to face January 1, 2000. In thousands of articles and speeches—regardless of the immediate topic at hand—we are reminded that our century is about to close and that we must take certain steps to adjust to the new etiquette in store for us.

Silently Crossing a Boundary

Writers concerned about the future usually speak of it as a challenge or struggle that we will face or confront. The vocabulary of futurists often sounds like we are preparing for war or natural disaster rather than silently crossing a boundary of time, an event that will go unnoticed by non-human living beings.

What happens the first week of the twenty-first century will, unfortunately, not differ much from that of the preceding week. But if we wished to do things differently, to make decisions, take actions, and change customs, we could do that needing no other excuse than that we lived in a new century. That would be adequate justification for simply doing the things that we know need doing. If we transferred our energies from speculation about how to prepare for 2000 to thinking about what projects we might embark upon once there, we would be engaging our minds more productively.

As many futurists have pointed out, America has moved from an

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industrial period whose products were goods and services to a post-industrial age whose main product is information. New communications technology such as cellular radio, two-way cable, personal computers, videotext, fiber optics, and satellites are responsible for the creation of more information and for its faster distribution. People at the end of the information chain, including end users and the information specialists who assist them, will have to make firm decisions about what data is useful and what information is likely irrelevant or superfluous. In medicine, law, economics, government, education, industry, agriculture, space exploration and hundreds of other fields, we need better data in order to make clearer choices.

As librarians and information scientists we have come to the end of this century with more concerns and interests than our colleagues in 1900 could have put in their dreams. Few of our professional ancestors were concerned with illiteracy, access to government information, affirmative action, preservation, architecture, unattended children, participative management, strategic planning, information policy, fund-raising, outreach, continuing education, and networking. And this list details only matters that, while important, are nonetheless mundane. The changes that have transformed America's libraries from midcentury on have to do with automation and information systems. Dependent on technologies undreamed of at the beginning of this century, libraries must now be interested in any advances in communications technology with educational applications, from hypertext to high definition television.

What has become quite clear to us at the end of 100 years of library activity is an appreciation of the amount of print and non-print information available in America, a belief in the ability of automated systems to help us locate and deliver this material, and a sense that once we have successfully done this we will have made a difference in someone's life. What we are going to discover in the century to come, if we haven't learned it by then, is that this process will be successful to the extent that it takes place within collapsing periods of time. For it is timeliness, I believe, that is destined to be one of the new criteria by which the practice of librarianship is judged.

It is such commonplace knowledge that we live in an age of information that it now deadens a conversation even to point this out. We, however, were not the first ones to inhabit this period, begun by the pre-Revolutionary pamphleteers. America was conceived in the belief that information and the diffusion of it were important to the

people and our first leaders are proof of this. Mr. Washington was as well-informed in his day as President Bush is in his and the first president's belief in learning not so ancillary to his values that he was forced to refer to himself as the "education president." Our nation was founded amidst the publication of broadsides and newspapers and any American living in 1789 who chose to think about the matter could have predicted that the day would come when our private and public libraries would overflow with a bounty of books that is the natural accompaniment to a democratic government. Our forebears, of course were much less self-conscious about the multiplication of printed material than we.

A Future Shaped by Information

Two centuries after General Washington's inauguration we have as many things to be concerned about as he did, but we have come to believe that our future will be shaped by our use of information. It is not so much that we have endured an "information explosion," but that we have become sensitive to the resources we have and the uses to which they might be applied. It is as if someone who lived a lifetime in New York City were dropped by parachute into Yellowstone National Park and decreed that we were undergoing an "evergreen explosion." Information is not a new event but a newly appreciated commodity.

As librarians and information scientists we are professionally aware of the proliferation of printed material, the increase of databases, and the transformations experienced by the use of compact storage formats. That there will be more publications and that they will be issued in formats that change as new technology changes is easy to predict. That our adjustments to such conventional trends have at times seemed difficult suggests that we have been too close observers of the present at the expense of daydreaming about our likely future. In the few years that now separate us from the twenty-first century we will find ways to cope with burgeoning data and new information systems. But there is a third factor that will come to be as significant as the sheer load of information increases and the changes in the means by which it reaches us —the factor of time.

Although it is a classic criticism of school children that their short attention span hinders learning by slowing the process by which information is assimilated, it is a habit borne of defense

against too great a mass of instruction as well as a wish to maintain a balance of interests. A short attention span, once viewed as a disability, is becoming a useful strategy for successful living in a fast-forward society that does not believe in long-term decision making, endless historical rumination, or second-guessing of events. Even in the case of miscarriages of justice and great civil wrongs, America does not have unlimited time for remorse. The characteristic brisk pace set by business, industry, and Wall Street has been accelerated even more by developments in information technology and computer communications. Government and education, previously immune to the acceleration of time, are now being influenced by technological innovations that call for faster decisions and shorter tutelage. The evidence of an accelerating clock is everywhere around us, as is proof that we need to make decisions within a shorter period of time as a condition of calling them successful.

Understanding Things Faster

In professional football games a disputed call by the field judges can be referred to other officials who view a video replay and then uphold or overturn the original decision. This encumbrance was introduced for the sake of better decisions, but is usually seen by the audience as an intrusion. The spectators want a crisp game played under conditions set by the clock while officials have wished to take advantage of technology to produce better judgments. We realize both that we have a limited time in which to do things and that we need to understand things faster in order to do them right.

Although for several decades we have been taught to dread the government of the Soviet Union, unprecedented reforms by Mikhail Gorbachev have undermined the general distrust we are encouraged to hold. While initiatives between private individuals and large corporations are taking place between the two countries, the U.S. government, unable to shed post-World War II prejudices, is only slowly adjusting to the new realities. Even though we have the means at our disposal for accelerated information gathering and a shorter learning curve, outdated political positions are capable of postponing the arrival of knowledge.

Of dramatic things that can be known, some are known immediately, such as the reasons for the wreck of the Exxon *Valdez* in Alaska's Prince William Sound. Some things are learned late, such as the

revelation that President Nixon pondered using nuclear weapons on four occasions during his presidency in an effort to end the Vietnam War. And some things are never learned at all, such as ultimate culpability in connection with the death of four antiwar protestors at Kent State University almost twenty years ago. Legal papers, court records, and manuscripts concerned with the Kent State disaster are now in the archives of Yale University and available to researchers. We are even challenged to reinterpret events that we lived through. The Carter Presidential Center, with twenty-seven million documents from Jimmy Carter's term as President, provides a television console with four buttons in which visitors can select a means for dealing with a difficulty such as the Iranian hostage crisis. The buttons allow you to attack with military force, negotiate, apply sanctions, or try all options. The time imperative of video games is now applied to selecting foreign policy.

As we appreciate that there is more to learn, less time to accomplish it, and that we have the means to recall data at higher rates of speed and in new formats, much of our conventional means of teaching will alter. The belief that learning requires a long period of time and that the quality of what we learn is enhanced by the ordeal of acquiring it, will end in the next century. Likewise, the notion that higher learning can only be transmitted in cloistered settings will end. A recent article in *The New York Times* pointed out that the average time to earn a Ph.D. degree in America has spread from five to seven years. That is not the fault of students, but of universities that lack the discipline to impart information under deadlines.

The practice of teaching, slower to change than librarianship, will find it convenient to break out of segmentation. We have the digital clock as symbolism that all seconds in a minute can be useful and that instruction need not extend to fifty minute blocks scattered throughout the weeks and months. Some information can be imparted immediately, some information requires several hours of transfer. What we will see end in the new century is instruction from the lower grades through higher education that is confined to set chunks of time regardless of the significance and complexity of the material. Libraries, never confined to instruction set by the clock, will continue to have this advantage in imparting knowledge if only they will make use of it. Our strong advantage is our breadth of interest, our ability to retrieve relevant material quickly, and our willingness to collect new information regardless of how it qualifies data already in our possession. What we have to do, however, is to put a sharper

point on public service, put information into the hands of our users more quickly, be willing to make discriminations about the quality of our material, and help our users understand the process by which information is converted into useful knowledge. This implies, among other things, that we discard the role we have played as unbiased, impartial, and remote servants to pose instead as highly informed, opinionated professionals willing to participate on a first-name basis with our clientele.

In the next century we are going to find it necessary to personalize our institutions, spare our users familiarity with inhouse procedures and protocols, and refuse to allow public access computers to become the modern barrier to individual staff assistance, a position enjoyed for so many years by the public card catalog.

We know that what libraries finally deliver is not merely data, statistics, and information but an accretion of shared experience that leads to new ideas and insights, to knowledge and, finally, to some degree of the mastery of knowledge—wisdom. Our ultimate product will not change merely with the change of centuries, but the path to that destination most certainly will be different.

Shorter Attention Spans

We are going to find that the shorter attention span characteristic of young learners will be an attribute of their parents as well. In the next century our patrons will have more broadly ranging interests but possess less time to inquire into them. Our audience will continue to be the young and the old, the retired and handicapped, housewives and businessmen, student users and corporate users, amateur scholars and professional researchers, blue collar workers and members of professions, and our most important constituency—children. But we are going to have to serve our users with greater respect for the clock. As ABC concluded after losing millions of dollars on the mini-series "War and Remembrance," not even a dramatization of World War II can sustain attention beyond five or six hours.

To serve this audience and serve it well we are going to have to crunch knowledge in the way that computers crunch numbers. We are going to have to do more than keep abreast of new communications technology, we are going to have to embrace it. We are going to have to buy FAX machines when they come out on the market, not ten years later. In order to retain our pedestal built on broad, humanitarian inquiry, we are going to have to construct a credibility based on

the use of time-saving communications technology. All the events happening around us are encouraging us to be less profligate with time—fast food, accelerated education, shorter and more frequent vacations, express mail, automatic banking, video-conferencing, and numerous other trends.

The American poet William Carlos Williams once wrote that "There must never be permitted confusion. Everything must be known immediately and at once." That is a poetic ideal that we will never achieve but that libraries—school, public, and academic—will come closer to bringing about in the twenty-first century than any other institution.

As there is more to know and less time to know it, there are also fewer people capable of absorbing what there is to know. Libraries, like schools and governments, fail everyday in the effort to shorten the distance between ignorance and enlightenment. Today we have faster delivery services, compact storage formats, greater sharing power, and alternatives to print on paper. But the old issue will remain, because it is the important one: what have we done today that makes a difference.

An Interpreter as Well as Gatherer

The information professional in the new century will certainly insist on more sense of accomplishment, on knowing more precisely that a service has been provided, knowledge extended, and the end user left satisfied. School and corporate librarians, confronted with the same challenges, are going to want to end the day with a sense that they have done something of consequence, made an impact. It will not be enough for our successors to locate a source of data, but they must be helpful in putting that information to active use. The information specialist is not an individual loaning books, but an active participant in the process of sharing ideas, loaning knowledge.

The librarian of the coming century will be an interpreter as well as a gatherer of information. Broadly equipped with information systems, elaborately reinforced with sources of data, the information specialist of the future will be much more of an arbiter and guide than we have been. The information specialist will flourish to the extent that he takes himself seriously—the first step to be taken seriously by others. The days are ending when we can find our full meaning in acquiring and processing, retrieving and loaning. What we do that is meaningful will be based on the wishes of our clientele.

We are going to have to get out of the library business and into the library-serving-people business. We are going to have to become students of our public rather than devotees of our procedures. Librarians of the future are going to have to vacate their offices, abandon their desks, and materialize before the public as managers of information with more presence than shoe clerks and lighthouse tenders.

It is certain that ignorance will be less tolerated in the twenty-first century than it was in ours, that there will be harsher penalties for it and greater rewards for amassing knowledge. Libraries are in the highly imprecise but crucially important business of enriching our minds.

Hugh Kenner, in a speech commemorating the Millionth Volume Celebration some years ago at the University of California at Santa Barbara spoke of the mission of our libraries: "After two thousand years of manuscript and printing press technology, all that we have succeeded in establishing and preserving is a system of cues and signals to aid us if we chose to reconstruct in our minds certain mental forms that our forefathers thought worth remembering. That is all. We know how to package those systems of cues and signals, and how to duplicate the packages so that someone in Santa Barbara and someone else in Berlin can pass their eyes over the same marks. We have no way whatever to guarantee that anything of interest will happen next; only the ancient oral tradition, transmitting, shakily, procedures for the intiricate mental dance that those marks can more or less set in motion. And it is only that dance of the mind that can claim to justify the whole enormous, expensive enterprise."

Libraries will succeed in the next century to the extent that they are seen as active purveyors of ideas, hold out the promise of greater personal happiness by exposure to ideas, and offer the fulfillment that comes with more perfect communication with others.

Laurie Anderson, the performance artist, once said that she preferred the "communal sensuality" of going to the movies rather than watching television. "Television is supposed to be a more direct way to communicate. But I don't want a direct line into anyone's brain. It was hard to have a real conversation 100 years ago and the miracle of really talking and listening to a person will still be as rare."

Libraries have never had a direct line into anyone's brain either. But the tenuous link that it offers, cherished over the years, has changed lives and will continue to change lives. That is, as an institutional goal, an end that we can feel proud to serve.